SENSORES DE HUMEDAD Y TEMPERATURA

DPF10

Sensor humedad y temperatura mural

Humedad: 10...95%
Temperatura: -5..+55ºC

Alimentación 15..40 Vcc / 24 Vac
Opción modelo con display LCD
Salida mA / Vcc, tambien Pt100, para temperatura.
Precio muy cometitivo

SEÑAL DE SALIDA

mA Vcc Ω

Mural interiores

Sensor combinado con sensor capacitivo, bajo coste, para uso domotica, control salas.

DPF160

Sensor humedad y temperatura mural, conducto y exterior

Humedad: 5...98%
Temperatura: -15..+605ºC

Alimentación 15..35 Vcc / 24 Vac
Para conducto ventilación.
Salida mA / Vcc, RS485.
Precio muy cometitivo
Rango programable

SEÑAL DE SALIDA

mA Vcc Digital RS...

Mural/conducto interiores

Sensor combinado humedad y temperatura, sensor de alta calidad y precio muy competitivo.

UTA

Sensor humedad y temperatura EXTERIOR

Humedad: 0...100%
Temperatura: -40ºC ÷ +60ºC

Alimentación 10...30 Vcc
Protector solar en aluminio
Salida mA / Vcc, o Pt100 y RS485
Con ventilación natural o forzada

SEÑAL DE SALIDA

mA Vcc Digital RS...

Exterior meteo

Sensor combinado para uso en exterior, montaje en mastil meteorologico.

ESFTF

Sensor humedad y temperatura PRESIÓN

Humedad: 10...95%
Temperatura: 0ºC ÷ +50ºC

Alimentación 16...36 Vcc
Rosca 1/2".
Salida mA / Vcc.

SEÑAL DE SALIDA

mA Vcc

Aire comprimido

Sensor para instalar en tuberia presión (max. 20 Bar), sistemas de aire comprimido.

H10PT

Sensor humedad y temperatura

Humedad: 15...90%
Temperatura: -10ºC ÷ +60ºC

Alimentación 12...30 Vcc
Cable 3 metros PVC
Salida 0...10 Vcc (HR)- Pt100
Longitud 126 mm diámetro 20 mm

SEÑAL DE SALIDA

Vcc Ω

Mural interiores

Sensor combinado de bajo coste, adecuado para domótica, almecenes,...

DPF07

Registrador humedad y temperatura

Humedad: 5...95%
Temperatura: -40ºC ÷ +70ºC

Alimentación bateria (1 año)
Puerto USB para desgarga de datos
Almacenaje de hasta 32000 lecturas
Software de control y registro.

SEÑAL DE SALIDA

Registrador interiores

Económico sistema para el registro de humedad y temperatura.

MAS-1

Sensor humedad del suelo

Humedad: 0...100%

Contenido volumétrico de agua
Cable 2 metros PVC
Salida 4...20 mA (VWC)
Dimensiones 8.9 x 1.8 x 0.7 cm

SEÑAL DE SALIDA

mA

Suelo agricultura

Sensor para la medida de la humedad en el suelo, sector jardineria, agricultura, obra civil,...

HIBOK302

TERMOHIGRÓMETRO H. Rel., Pto. rocio, Temp., Búlbo húmedo

Humedad: 1...99%
Temperatura: -20ºC ÷ +60ºC

Termo higrómetro digital portátil, con doble display.
Puede medir humedad relativa, humedad absoluta, punto de rocío y bulbo húmedo.
Fácil manejo

SEÑAL DE SALIDA

Control ambiental

Recomendable para uso general, aire acondicionado, cámaras de frío, alimentación y conservas, etc

www.guemisa.com - Tfno.: 91 764 21 00 - ventas@guemisa.com

DPF10

Humidity and temperature transmitter

HVAC Humidity and Temperature Transmitter for Indoor Applications

DPF10 room transmitters are the ideal solution for indoor applications such as HVAC in residential and official buildings.
The very stylish, functional housing makes easy installation and fast exchange of the sensing unit for service purposes possible. The high quality DPF humidity sensor and state-of-the-art microprocessor controlled electronics are the guarantee for best accuracy and a wide range of options.
The standard humidity output of DPF10 transmitters is 4 - 20 mA or 0 - 10 V. The temperature output signal can be active or passive.
All DPF10 versions can be equipped with a good legible LC display. For DPF10-FT versions the displayed values for humidity and temperature will alternate.

Typical Applications

building management for residential and office areas
air conditioning
switching cabinets
climate control in hotels and museums

Features

excellent price / performance ratio
easiest installation
modern design
long term stable
optional display
traceable calibration

Technical Data

Measuring Quantities

Relative Humidity

Humidity sensor	HC103	
Analogue output 0...100 %r.H.	0-10 V	-1 mA < I_L < 1mA
	4-20 mA (two wires)	R_L < (U_V-10)/0.02 < 500 Ohm
Working range[1]	0...95 % RH	
Accuracy at 20°C (68°F) and U_V=24VDC	±2% RH (40...60% RH) ±3% RH (10...90% RH)	
	Traceable to intern. standards, administrated by NIST, PTB, BEV...	
Temperature dependence at 60% RH	**typical 0.06% RH /°C (0.03% RH / °F)**	

Temperature (active output)

Analogue output 0...50°C (32...122°F)[2]	0-10 V	-1 mA < I_L < 1mA
	4-20 mA (two wires)	R_L < (U_V-10)/0.02 < 500 Ohm
Accuracy at 20°C (68°F) and U_V=24VDC	FT3: ±0.25°C (±0.45°F)	FT6: ±0.4°C (±0.72°F)

Temperature (passive output)

Type of T-Sensor	please see ordering guide

General Data

Voltage supply (U_V)		
for 0 - 10 V	15 - 40 VDC or 24 VAC ±20%	
for 4 - 20 mA	28V DC > U_V > 10 + 0.02 x R_L (R_L < 500 Ohm)	
Current consumption	for DC supply:	typical 4 mA
	for AC supply:	typical 15 mA_{eff}
Electrical connection	screw terminals max. 1.5 mm^2 (AWG 16)	
Display	for DPF10-FTx version	Humidity / Temperature alternating
	for DPF10-Fx and DPF10-FPx version	Humidity
CE compatibility according	EN 50081-1	FCC Part15 ClassB
	EN 50082-1	ICES-003 ClassB
Temperature ranges	working temperature range:	-5...55°C (23...131°F)
	working temperature with display:	-5...55°C (23...131°F)
	storage temperature range:	-25...60°C (-13...140°F)

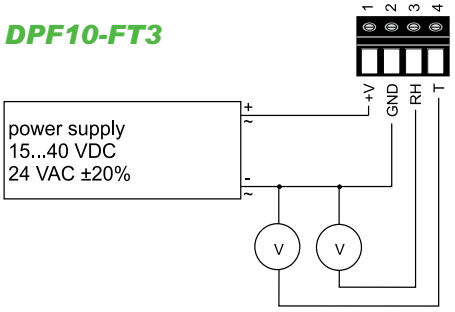
1) Please refer to the working range of the HC103
2) Other T-scaling refer to page 134

DPF10

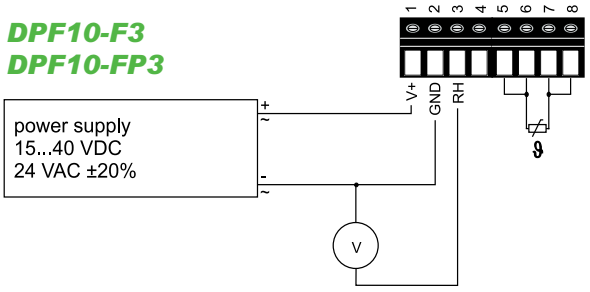
Humidity and temperature transmitter

Connection Diagram

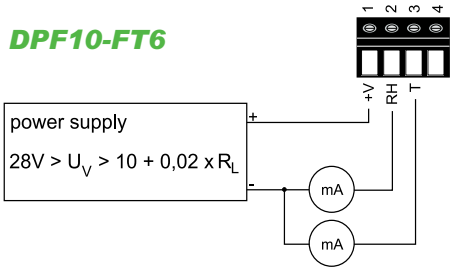
DPF10-FT3



DPF10-F3
DPF10-FP3

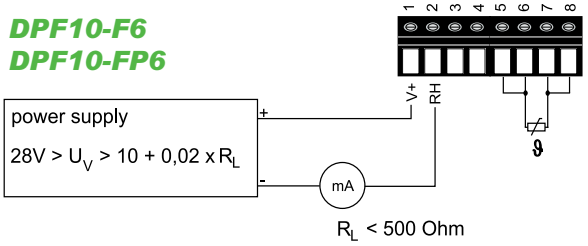


DPF10-FT6



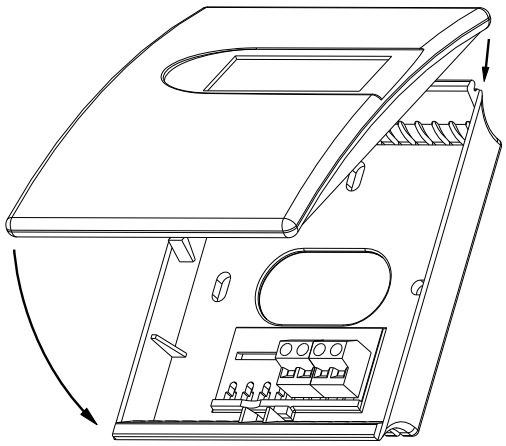
R_L < 500 Ohm

DPF10-F6
DPF10-FP6



R_L < 500 Ohm

Dimensions (mm)



W x H x D = 85 x 100 x 26mm
(3.3 x 3.9 x 1 inch)

Housing: PC
Protection class: IP20

Housing colour: Cover: RAL 9003 (signal white)
Back: RAL 7035 (light grey)

(other colours upon request)

Order Example

DPF10-FP6D-D04-T04

Model:	Humidity + Temperature Transmitter with passive T-output
Output humidity:	4-20mA
Output temperature:	Pt 1000 DIN B
Display:	with Display
T-Unit:	°C
T-Scale:	0...50°C

Ordering Guide

MODEL		OUTPUT		T-SENSOR (only passive)		DISPLAY		T - UNIT (only for (D04))		T-SCALE (only for FT)	
humidity + temperature	(FT)	0-10V	(3)	Pt 100 DIN A	(A)	without display	(--)	°C	(--)	0...50	(T04)
humidity	(F)	4-20 mA	(6)	Pt 100 DIN B	(B)	with display	(D04)	°F	(E01)	-5...55	(T31)
humidity + temperature passive	(FP)			Pt 1000 DIN A	(C)					0...40	(T55)
				Pt 1000 DIN B	(D)					other	(Txx)
DPF10-											

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DPF160

Humidity and temperature transmitter

HVAC Humidity and Temperature Transmitter

Specially designed for HVAC, the DPF160 sensor by DPF Sensors is a cost-effective, highly accurate and reliable solution for measuring relative air humidity and temperature.
The enclosure minimizes installation costs and provides outstanding protection against contamination and condensation, thus ensuring flawless operation.

The DPF160 employs the new humidity/temperature DPF sensor element HCT01 with excellent long term stability and resistance against pollutants. In combination with a long calibration experience, the DPF160 provides a measurement accuracy of ±2.5%RH and is available for wall or duct-mounted with current, voltage or Modbus RTU output.

The configuration equipment allows user setup for the output scaling and for the interface parameters, as well as humidity and temperature adjustment of the sensor.

Easily Adapted for the US Market

» Knockout for ½" conduit fitting

External mounting holes

» Mounting with closed cover

» Electronics protected against construction site pollution

»Easy and fast mounting

Electronics on the Underside of the PCB

» Optimum protection against mechanical damage during installation

Bayonet Screws

» Open/closed with a ¼ rotation

Cast Electronics

»Mechanical protection

»Condensation-resistant

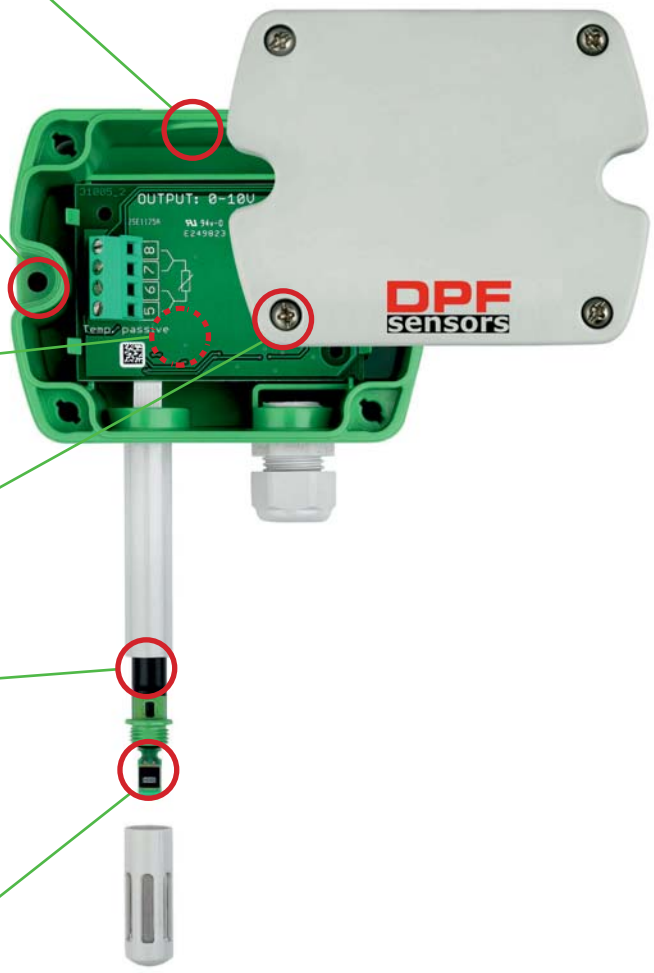
DPF Humidity sensor HCT01

»Long-term stability

»Protected RH sensor surface

»Protected solder pads

»Tested according to automotive standard AEC-Q200



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DPF160

Humidity and temperature transmitter

Technical data

Measured values

Relative Humidity

Sensor	DPF Sensor HCT01-00D	
Analog output 0...100% RH	0-10 V	-1 mA < I_L < 1 mA oder
	4-20 mA (two-wire)	R_L < 500 Ohm
Digital output	RS485	
Working range	10...95% RH	
Accuracy at 20°C	±2.5% RH	
Temperature dependency	typ. ±0.03% RH/°C	

Temperature

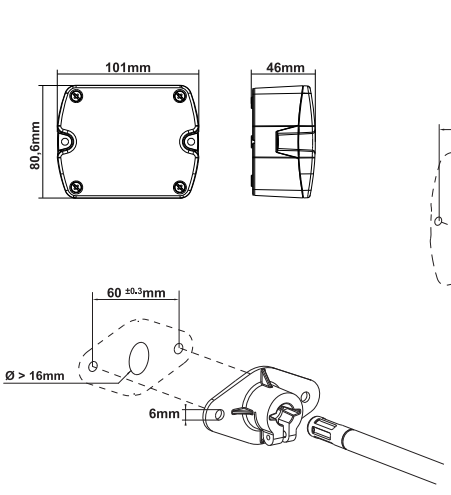
Sensor	Pt1000 (tolerance class B, DIN EN 60751)
Analog output[1)]	0-10 V
	4-20 mA
Digital output	RS485
T-Accuracy at 20°C	±0.3°C
passive T-output	see ordering code

General

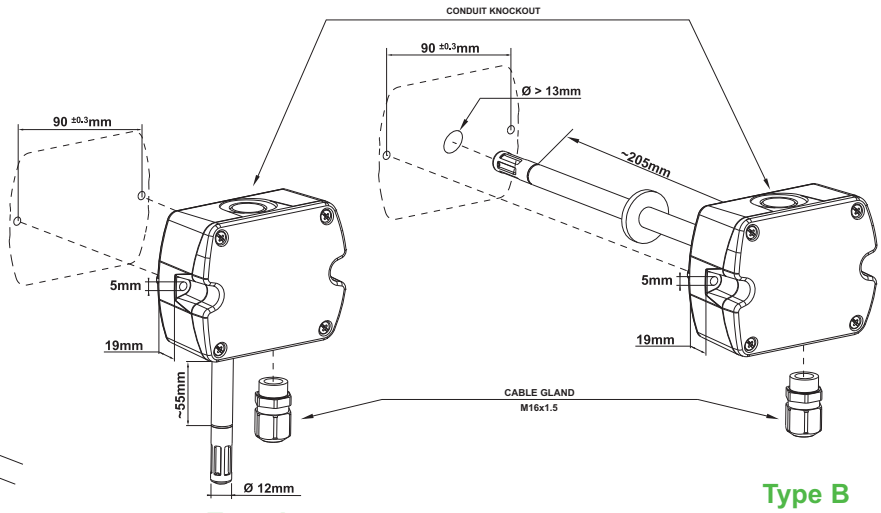
Power supply		
for 0 - 10 V / RS485	15 - 35V DC or 24V AC ±20%	
for 4 - 20 mA	10V + R_L x 20 mA < U_V < 35V DC	
Current consumption		
Analog	with DC power supply typ. 5mA	
	with AC power supply typ. 13mA$_{eff}$	
Digital	with DC power supply typ. 15mA	
	with AC power supply typ. 25mA$_{eff}$	
Connection	Screw terminals, max. 1.5 mm²	
Housing / protection class	Polycarbonate (UL listed) / IP65	
Cable gland	M16 x 1.5	
Sensor protection	membrane filter	
Electromagnetic compatibility	EN61326-1	CE
	EN61326-2-3	
Temperature ranges	Operating temperature:	-15...60°C (5...140°F)
	Storage temperature:	-25...60°C (-13...140°F)

[1)] Output scaling see Ordering Guide

Dimensions (mm)



Type A

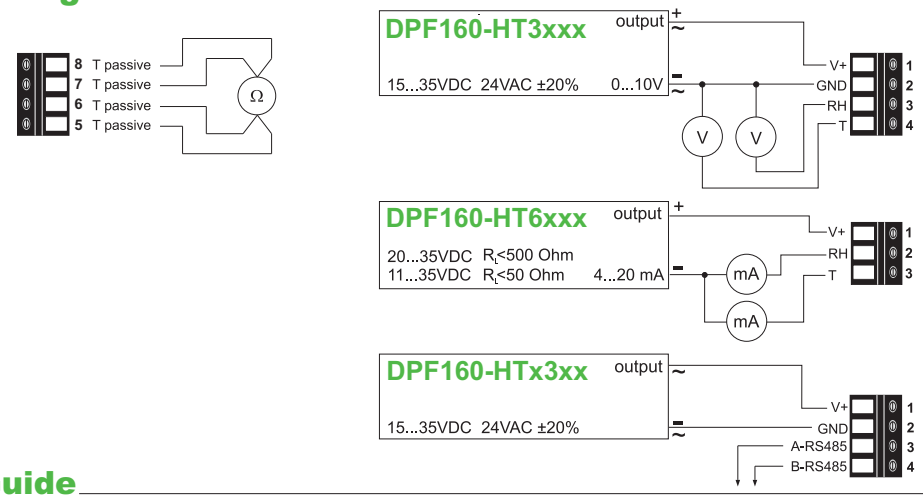


Type B

DPF160

Humidity and temperature transmitter

Connection diagram



Ordering Guide

Configuration

ModEl	ANAloG [1]	dIGITAl [1]	PASSIVE T-SENSoR [2]	HoUSING	TYPE	fIl TER
humidity + temperature (HT)	0-10V (3)	RS485 (3)	Pt 100 DIN A (A)	polycarbonate (P)	wall mount (A)	membrane filter (B)
	4-20mA (6)	none (x)	Pt 1000 DIN A (C)		duct mount (B)	
	none (x)		NTC 10k (E)			
			none (x)			
DPF160-						

Interface parameter - analog output

oUTPUT SCAIING	SCAIING		UNIT
temperature (Tx)	°C	°F	metric (M)
	-20...80 (024)	-32...122 (076)	non-metric (N)
	-40...60 (002)	-40...140 (083)	
	-10...50 (003)	0...180 (026)	
	0...50 (004)		
	other Scalings see Datasheet „T-Scaling“		

Interface parameter - digital output*

PRoToCol	BAUdRATE	PARITY	STOPBITS	UNIT
modbus (1)	9600 (A)	odd (o)	1 stopbit (1)	metric (M)
	19200 (B)	even (E)	2 stopbit (2)	non-metric (N)
	38400 (C)	no parity (N)		

[1] a combination of analog and digital version is not possible [2] analogue version only

DPF160-EXT

Accessories

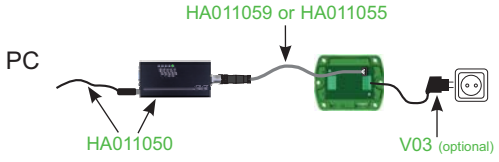
Configuration equipment: The configuration equipment allows user setup for the output scaling and for the interface parameters, as well as humidity and temperature adjustment of the sensor.

Position 1:
- configuration adapter (incl. USB cable for PC) (HA011050)

Position 2:
- for DPF160 analog: cable for configuration adapter (HA011059)
- for DPF160 digital: cable for configuration adapter (HA011055)

Position 3:
- configuration software: free of charge; download: www.dpfsensors/dpf160.html (2013)

Position 4 - optional:
- power supply for DPF160 (V03)



Order example

Analog output

DPF160-HT6xAPAB-Tx001M

Model:	humidity + temperature transmitter
Analog output:	4-20mA
Passive T-Sensor:	Pt 100 DIN A
Housing:	polycarbonate
Type:	wall mounting
Filter:	membrane filter
Output scaling:	temperature
Scaling:	-30...40°
Unit:	metric

digital output

DPF160-HTx3xPBB-1AE1N

Model:	humidity + temperature transmitter
Digital output:	RS485
Housing:	polycarbonat
Type:	duct mounting
Filter:	membrane filter
Protocol:	Modbus
Baudrate:	9600
Parity:	even
Stopbits:	1
Unit:	non-metric

Sistemi per monitoraggi ambientali e telecontrolli

UTA Sensore Termoigrometrico con ventilazione naturale
Thermoigrometric sensor with natural ventilation
UTAV *Sensore Termoigrometrico con ventilazione forzata*
Thermoigrometric sensor with fan

Sensore realizzato in **conformità agli standard WMO** (World Meteorological Organization), disponibile anche nella versione con **ventilazione forzata** (cod. UTAV).
Temperatura: Elemento sensibile a termoresistenza **Pt100 1/3DIN** con collegamento a **quattro fili**, uscita a Pt100 oppure segnale elettrico normalizzato in corrente o tensione (4÷20mA, 0÷2Vdc) o **RS485/Modbus**.
Umidità relativa.: Sensore per la misura dell'umidità relativa dell'aria a basso consumo (<0,1W), costituito da un elemento a film sottile la cui capacità varia linearmente con l'umidità relativa dell'aria. Disponibile con uscite di segnale normalizzato in tensione o corrente (0÷1Vdc, 4÷20mA) o **RS485/Modbus.**

*Sensor manufactured **according to standard WMO** (World Meteorological Organization) and is also available in versions with **forced ventilation** (code. TAV).*
Temperature:** RTD sensing element **1/3DIN Pt100**, connection with a four-wire Pt100 output or electrical signal in current or voltage (4÷20mA, 0÷2Vdc) or **RS485/Modbus.
Relative Humidity:** Sensor for air relative humidity measurement at low power (<0.1 W), made of a thin film that changes the capacity in linear mode with the air humidity. Available with different signal outputs, normalized voltage or current (0÷1Vdc, 4÷20mA) or **Rs485/Modbus.

Caratteristiche salienti / *Highlighted specs*

- Sensore di temperatura e umidità preciso ed affidabile / *Accurated and reliable Air Humidity & Temperature Sensor*
- Sistema di misura di tipo a termoresistenza Pt100 e capacitivo / *Measure with high precision capacity and RTD Pt100*
- Struttura in robusto alluminio per climi caldi e freddi / *Compact and light design in aluminium for hot and cold climates*
- Conforme allo standard WMO / *According to the WMO standards*
- Disponibile con ventilazione forzata / *Available with forced ventilation*
- Conforme alle norme CE /*According to* CE *norms*

Dati tecnici / *Technical Data*

Campo di misura tipico temperatura **[umidità]** *Temperature **[humidity]** typical range*	-40 ÷ +60°C, **[0 ÷ 100%Rh]** (-60+70°C available)
Risoluzione temperatura **[umidità]** *Temperature **[humidity]** resolution*	0.01°C, **[0.05%]**
Precisione temperatura **[umidità]** *Temperature **[humidity]** accuracy*	DIN 43760 1/3DIN (±0.1°C @ 0°C), **[± 2% f.s.]**
Tempo di risposta temperatura **[umidità]** *Temperature **[humidity]** response time*	< 8 s, **[< 8sec (10÷80%RH)]**
Tipo di trasduttore *Type of transducer*	Termoresistenza al Platino 1/3DIN / *platinum resistance* Pt100 1/3DIN (100Ω @ 0°C), **[capacitivo / capacitive]**
Ventilazione *Ventilation*	Naturale / *natural* (cod. **UTA**) Forzata / *Forced* (cod. **UTAV**)
Segnale di uscita *Signal out*	**N:** 0÷1 Vdc(Rh) & Pt100 (T); **A:** 0÷1 Vdc(Rh) & 0÷2 Vdc (T) ; **B:** 4 ÷ 20mA (Rh) & 4 ÷ 20mA (T) ; **C: 2 x RS485 /ModBus**
Condizioni operative *Working conditions*	-50 ÷ +80°C (-60 ÷ +80°C *available*)
Protezioni *Protections*	contro inversione di polarità e scariche atmosferiche *polarity reverse and transient*
Realizzato in *Made of*	lega di alluminio verniciato, viterie in inox *aluminium alloy, stainless steel screws*
Alimentazione e consumo *Power supply and consumption*	10÷30Vdc, (typ.<0.1W, max 2W@12Vdc mod. TAV)
Peso *Weight*	680g

NESA Srl si riserva di apportare eventuali modifiche al presente prodotto senza obbligo di preavviso / *NESA Srl intend to do any modifications to this product without warning obligation*

Principio di misura

Il sensore combinato per la misura della temperatura e dell'umidità dell'aria UTA è costituito da una termoresistenza al Platino Pt100 (100Ω@0°C), sensibile alle variazioni di temperatura secondo la curva di risposta riportata nelle norme DIN 43760 1/3DIN. Per l'umidità, l'elemento sensibile è una capacità elettrica di precisione che varia il suo valore in funzione dell'umidità. Tale variazione viene trasformata in un segnale elettrico normalizzato in corrente o in tensione o digitale RS485 Modbus, che varia in modo lineare e preciso con l'umidità relativa e la temperatura dell'aria.

Taratura del sensore

Ogni strumento è tarato e verificato per comparazione con uno strumento campione primario certificato SIT/Accredia. A seguito della verifica, il sensore viene corredato di rapporto di taratura.

Manutenzione

Con periodicità (1volta/trimestre) pulire con un panno umido gli schermi bianchi. Non usare detersivi o spugne abrasive. Una volta all'anno ricalibrare l'elemento sensibile.

Measurement principle

The combined sensor for the measure of the Air Temperature and Humidity UTA, is made of a Platinum termo-resistance Pt100 (100Ω @0°C), sensitive to the change of temperature according to the DIN 43760 norms 1/3DIN.

For the umidity, the sensing element, is an high precision electrical capacity that varies as a function the humidity. This variance is converted into an electrical signal normalized in current or voltage or digital data RS485 / ModBus that is linear and follows exactly the relative humidity.

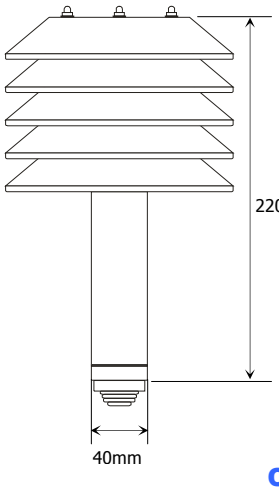
Calibration of the sensor

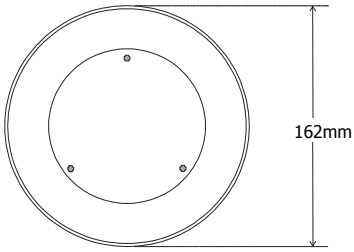
Every sensor is calibrated and verified comparing with SIT/Accredia primary certificated instrument. After the test the sensor is supplied with the calibration report.

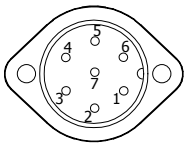
Maintenance

Clear periodically (1 time/quarter) the white screens cover with a wet cloth. Don't use detergents or abrasive sponges. Once a year, re-calibrate the sensing element.

Dimensioni e collegamenti / *Dimensions and connections*







Pin	UTA(V)-A	UTA(V)-B	UTA(V)-C	UTA(V)-N
1				T Pin1 Pt100
2	T Out V+	T Out I+	T RS485 A	T Pin1 Pt100
3	T Out V-	T Out I-	T RS485 B	T Pin2 Pt100
4	Gnd	Gnd	Gnd	T Pin2 Pt100/Gnd
5	Vdc:10÷28V	Vdc:10÷28V	12 Vdc	Vdc:10÷28V
6	RH% Out V+	RH% Out I+	RH% RS485 A	RH% Out V+
7	RH% Out V-	RH% Out I-	RH% RS485 B	RH% Out V-

Come ordinare / *Order Form*

Sensore Sensor	Sensore Temperatura e Umidità Relativa / *Air Temperature & Humidity Sensor*		UTA		
	Sensore Temperatura e Umidità ventilato / *Fan Air Temperature & Humidity Sensor*		UTAV		
Uscita Output	Temperatura/ *Temperature*	Umidità/ *Humidity*			
	0÷2Vdc	0÷1Vdc	A		
	4÷20mA	4÷20mA	B		
	RS485 / Modbus	RS485 / Modbus	C		
	Naturale/ *natural*: Pt100	0÷1Vdc	N		
Accessori Accessories	CS05 – Cavo 5m sensore-datalogger / *Cable 5m sensor-datalogger*			05	
	CS10 – Cavo 10m sensore-datalogger / *Cable 10m sensor-datalogger*			10	
	CSxx – Cavo lunghezza xx* m / *Cable xx* m length sensor – datalogger*			xx	
	SS1 – Supporto sensori l=500mm / *Sensors support l=500mm*				SS1
	SS2 – Supporto sensori l=1500mm / *Sensors support l=1500mm*				SS2
	SS3 – Supporto sensori l=900mm / *Sensors support l=900mm*				SS3

Esempio di codice d'ordine / *example of order code*: **UTA A 10 SS2**

per misure fuori standard specificare la lunghezza in metri / *specify the length for no standard measures*

NESA Srl si riserva di apportare eventuali modifiche al presente prodotto senza obbligo di preavviso / *NESA Srl intend to do any modifications to this product without warning obligation*

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Desde 1986 suministrando sensores e instrumentación
http://www.guemisa.com - ventas@guemisa.com

HYGRASGARD® ESFF/ESFTF

Screw-in humidity and temperature sensors for pressure systems, calibrateable

APPLICATION:
Series ESFF/ESFTF humidity sensors are used for measuring the relative humidity and temperature of air in pressure systems and convert these measured values into standard signals of 0-10V or 4...20mA respectively. These humidity sensors are to be operated in pollutant-free non-precipitating air, mounted vertical with the sensor pointing down.

ESFF
ESFTF

TECHNICAL DATA:

Power supply:..... 24V AC/DC for U variant
15...36V DC for I variant, R_L depending on working resistance

Sensors:..... digital humidity sensor with integrated temperature sensor, dew-proof, small hysteresis, high long-term stability ± 1% per year

Sensor protection:..... metal sinter filter, exchangeable

HUMIDITY:

Measuring range, humidity:..... 0...100% r.H.

Operating range, humidity:..... 10...95% r.H.

Deviation, humidity:..... ± 3% r.H. (40...60%) at +20°C, otherwise ± 5% r.H.

Output, humidity:..... 0-10V at U variant,
4...20mA at I variant, (transmitter R_L < 500Ω)

TEMPERATURE:

Measuring range, temperature:.... 0....+50°C

Operating range, temperature:.... 0....+50°C

Deviation, temperature:..... ± 0.5K at +20°C

Output temperature:..... 4...20mA

Ambient temperature:..... storage -25...+60°C, operation -5...+55°C

Electrical connection:..... 2- or 3-wire connection (see connecting diagram), 0.14-1.5 mm² via terminal screws on circuit board

Enclosure:..... plastic, material polyamide, 30% glass-globe-reinforced, with quick-locking screws, colour pure white (similar RAL9010)

Dimensions:..... 72 x 64 x 39.4mm

Cable union:..... M16, including strain relief

Protective tube:..... metal, brass, nickel-plated, Ø 20 mm

Process connection:..... screwed socked with ½" pipe thread

Nominal pressure:..... p_{nenn} < 20bar

Overload:..... max. 5-fold nominal pressure

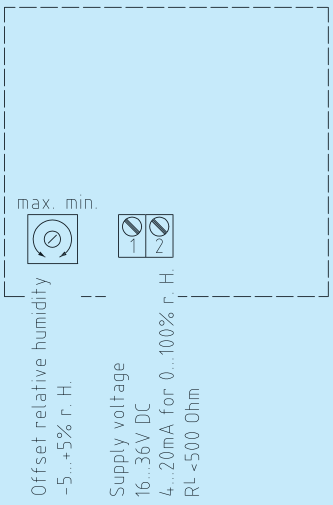
Burst pressure:..... p_{max} = 150bar

Protection class:..... III (according to EN 60730)

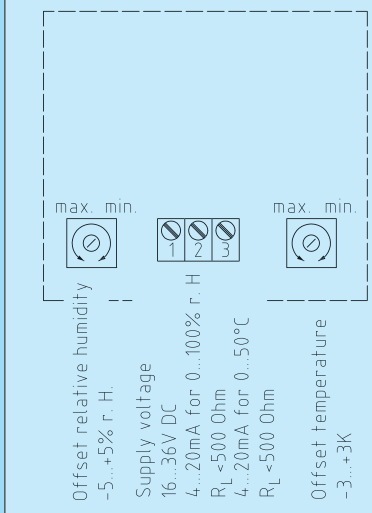
Protection type:..... IP65 (according to EN 60529)

Standards:..... CE conformity, electromagnetic compatibility according to EN 61326+A1+A2, EMC directive 89/336/EWG

Circuit diagram **ESFF-I**



Circuit diagram **ESFTF-I**



Connecting diagram **ESFF-I**

Supply voltage 15...36V DC
4...20mA for 0...100% r. H. R_L <500 Ohm

Connecting diagram **ESFTF-I**

Supply voltage 15...36V DC
4...20mA for 0...100% r. H. R_L <500 Ohm
4...20mA for 0...50°C R_L <500 Ohm

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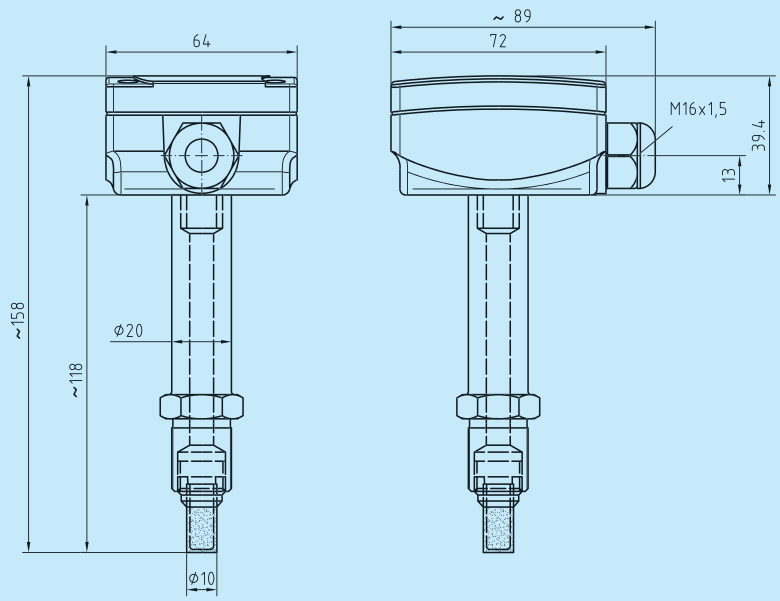
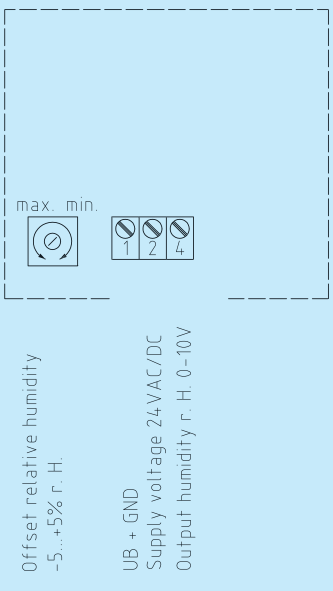
Tlfno.: (034) 91 764 21 00 Fax.: (034) 91 764 21 32
Email.: ventas@guemisa.com Web.: www.guemisa.com

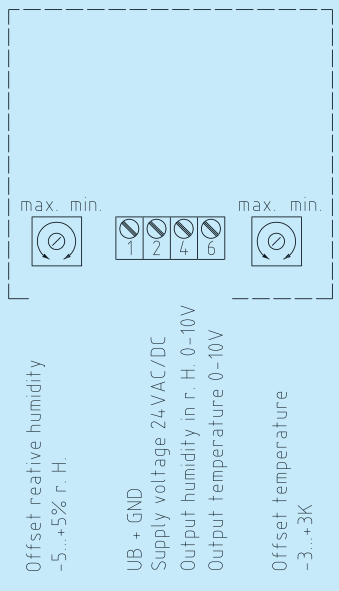
Dimensional drawing **ESFF ESFTF**



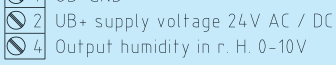
Circuit diagram **ESFF-U**



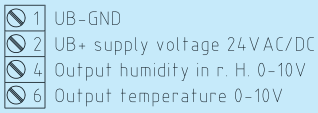
Circuit diagram **ESFTF-U**



Connecting diagram **ESFF-U**



Connecting diagram **ESFTF-U**



HYGRASGARD® **ESFF and ESFTF:**

Type/WG1	Range humidity (relative)	Range temperature	Output humidity (relative)	Output temperature
ESFF-I	0...100% r.H.	-	4...20mA	-
ESFF-U	0...100% r.H.	-	0-10 V	-
ESFTF-I	0...100% r.H.	0...+50°C	4...20mA	4...20mA
ESFTF-U	0...100% r.H.	0...+50°C	0-10 V	0-10 V

SENSOR HUMEDAD + TEMPERATURA

H10Pt

DPF sensors
www.dfpsensors.com

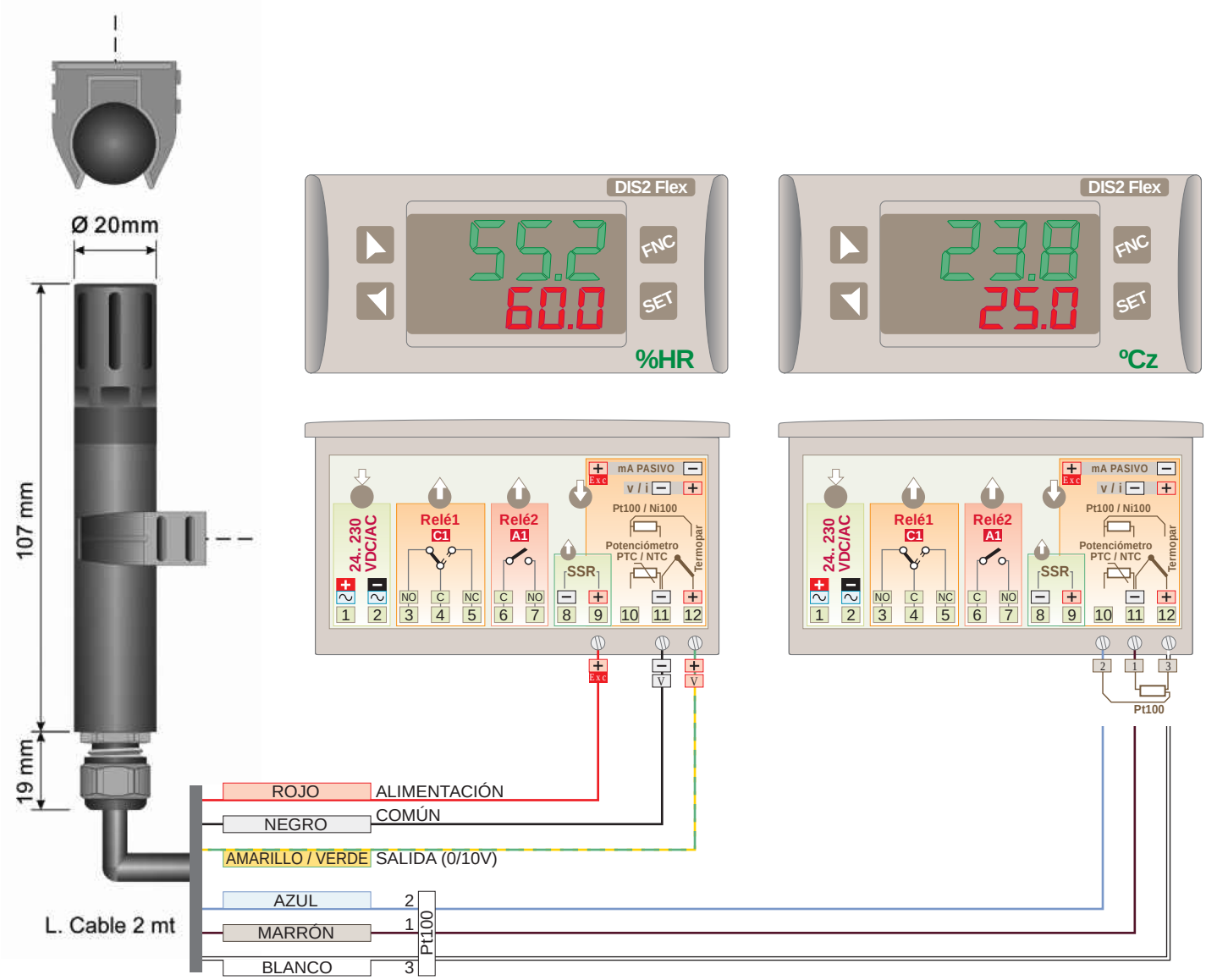
- DOMÓTICA
- AIRE ACONDICIONADO
- ALMACENES
- HUMIDIFICADORES
- DESHUMIDIFICADORES

HUMEDAD
0/100%HR
SALIDA
0/10V
%HR

TEMPERATURA
SALIDA
Pt100
ºC

Dimensiones:	Longitud 126.
	Diámetro 20mm.
	Cable 3mts.
Alimentación	12.. 30VDC.
Temperatura de trabajo:	-10/+60ºC
Filtro capuchón:	Malla metálica
Precisión a 25ºC:	±4%RH (15.. 90%RH)
Clip de plástico para montaje pared.	
Tiempo de saturación:	75seg. (25ºC - 50%RH)
Tiempo de respuesta a 25ºC:	2seg.

APLICACIÓN con REGULADOR DIS2 Flex



MONTAJE Y CONEXIONES ELÉCTRICAS

La humedad y la temperatura son unas unidades físicas fácilmente variables en un ambiente, especialmente si no está cerrado o sujeto a continuos y repentinos cambios de temperatura. Por estos motivos, el lugar y la posición en la que irá instalada y fijada la sonda de humedad y temperatura, debe ser el más adecuado posible, con el fin de obtener una correcta medida. Se aconseja instalar la sonda con el capuchón (sensor) direccionado hacia arriba, para protegerlo de eventuales salpicaduras de agua y evitar que esté en presencia de corrientes de aire.

ADVERTENCIAS:

- Proteger el sensor del agua (fría o caliente).
- Los cambios bruscos de temperatura pueden afectar temporalmente la medición. En este caso puede producirse condensación del sensor interno, alterando momentáneamente la lectura de humedad. No obstante, este fenómeno no provoca ningún daño a la sonda.

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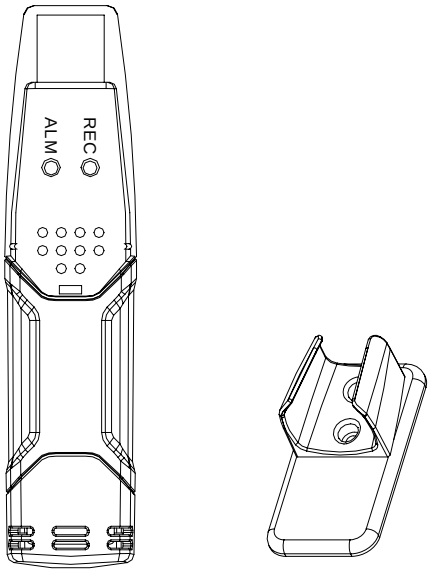
MANUAL DE INSTRUCCIONES

Medidor USB de temperatura y humedad



DPF sensors
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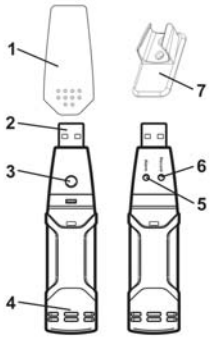
CARACTERÍSTICAS

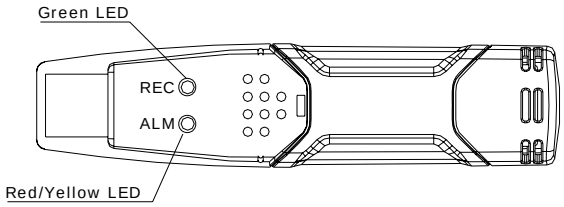
- **Memoria para 32,000 lecturas (16000 temperatura y 16,000 humedad)**
- **Indicador de punto de rocío (condensación)**
- **Indicador de estado**
- **Interface USB**
- **Alarma personalizable**
- **Software de análisis**
- **Personalización de lecturas**
- **Pilas de larga duración**
- **Ciclos de medición personalizables: 2s, 5s, 10s, 30s, 1m, 5m, 10m, 30m, 1hr, 2hr, 3hr, 6hr, 12hr, 24hr**

DESCRIPCIÓN

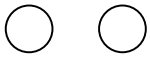
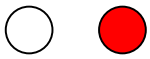
1. Carcasa de protección
2. Conector USB para el PC
3. Botón de encendido
4. Sensores de humedad y temperatura
5. Alarmas LED
6. Luz verde (midiendo)
7. Soporte



SIMBOLOGÍA DE LUCEZ LED



GUÍA DE ESTADO LUCES

LEDs	Indicador	Acción
REC ALM 	**Ambas luces LED apagadas** ***Datalogger no activo*** **o** ***Pilas descargadas***	**Puede empezar las mediciones** **Reemplace las pilas**
REC ALM	**Luz verde parpadea cada 10 seg. *** ***Datalogger activo y tomando lecturas, ninguna alarma activa***** **Parpadeo luz verde cada 10 seg.** ***Inicio mediciones retrasado***	**Para empezar las mediciones manualmente, pulse el botón hasta que las luces verde y amarilla parpadeen.**
REC ALM 	**Luz roja parpadea una sola vez cada 10 seg. *** ***Midiendo, alarma de baja humedad ****** **Luz roja parpadea dos veces cada 10 seg. *** ***Midiendo, alarma de alta humedad ****** **Luz roja parpadea cada 60 seg.** ***Pilas descargadas*******	**Si se han descargado las pilas, se pararan las mediciones. Reemplace las pilas. No se perderán los datos almacenados.**
REC ALM	**Luz amarilla parpadea una sola vez cada 10 seg. *** ***Midiendo, alarma para baja TEMP****** **Luz amarilla parpadea dos veces cada 10 seg. *** ***Midiendo, alarma de alta TEMP****** **Luz amarilla parpadea cada 60 seg.** ***Datalogger lleno. No caben más datos.***	**Descargue datos.**

* Para alargar la vida de las pilas, las frecuencias inficadoras de las luces LED pueden ser modificadas desde el software.

** Para ahorrar energía, la luz de alarma de temperature y humedad se puede descativar desde el software.

***Cuando las alarmas de temperature y humedad se activan, las luces LED alternan su ciclo.

****Cuando las pilas están descargadas, todas las mediciones se paran, pero los datos hasta el momento almacenados no se pierden.

ESPECIFICACIONES

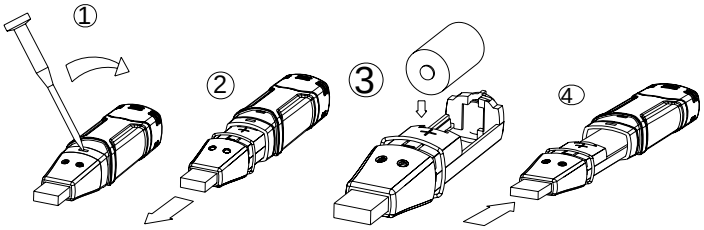
Humedad Relativa	Rango Total	0 to 100%
	Precisión (0 a 20 y de 80 a 100%)	±5.0%
	Precisión (20 a 40 y de 60 a 80%)	±3.5%
	Precisión (40 a 60%)	±3.0%
Temperatura	Rango Total	-40 a 70℃（-40 a 158℉）
	Precisión (-40 a -10 y de +40 a +70℃)	±2℃
	Precisión(-10 a +40 ℃)	±1℃
	Precisión (-40 a +14 y de 104 a 158℉)	±3.6℉
	Precisión (+14 a +104 ℉)	±1.8℉
Temperatura Punto de Rocío	Rango Total	-40 a 70℃（-40 a 158℉）
	Precisión (25℃, 40 a 100% HR)	± 2.0 ℃ (±4.0℉)
Intérvalos de lectura	Frecuencia de medición desde 2 segundos hasta 24 horas.	
Temperatura de Trabajo	-35 a 80℃（-31 a 176℉）	
Tipo pilas	3.6V litio(1/2AA)(SAFT LS14250, Tadiran TL-5101 o equivalente)	
Duración pilas	1 año (de media) dependiendo de la frecuencia de mediciones, temperatura ambiente y uso de alarmas y luces LED.	
Dimensión/ Peso	101x25x23mm (4x1x.9”)/ 172g (6oz)	

CAMBIO DE PILAS

Usar sólo pilas de litio de 3.6V. Antes de reemplazar la pila, retirar el aparato del PC. Siga la explicación del diagrama a través de los siguientes pasos:

1. **Con un objeto punzante (destornillador…), abra la carcasa en la dirección de la flecha.**
2. **Retire el Datalogger de la carcasa.**
3. **Reemplace/Inserte la nueva pila siguiendo los indicadores de polaridad que aparecen.. Las dos luces verde/amarilla) se iluminarán alternativamente como sistema de control.**
4. **Vuelva a introducer el Datalogger dentro de la carcasa. Ahora ya se puede volver a utilizar.**

AVISO:
Dejar el aparato por tiempo prolongado conectado al PC reduce la vida de las pilas.



CUIDADO: Maneje las pilas de litio con cuidado y siguiendo las normas legales sobre su uso y reciclaje vigentes en su país.

DPF07 DATALOGGER – GUÍA DEL

SOFTWARE Datalogger Graph Software Help

Version 2.0, August 07, 2007

En caso de necesitar información más detallada, consulte la guía incluida en el CD de instalación.

ÍNDICE

Instalación del Software….....2

Instalación del Driver USB.....2

Funcionamiento del Datalogger Graph Software.....2

Descripción de la Barra Menú 3

Simbología de la luz LED …….....7

1. INSTALACIÓN DEL SOFTWARE

Instale el Windows PC Datalogger Software que viene adjunto instertando el disco en la unidad de CD-ROM su computadora. En caso de que el software de instalación no se ejecute automáticamente, haga doble click encima del archivo SETUP.EXE incluido en el CD de instalación. Siga las instrucciones de instalación que le aparecerá en la ventana que se abrirá. Antes de utilizar el software del Dtalogger conecte el aparto en la unidad USB de su computadora e instale el correspondiente driver tal y como se indica en el siguiente apartado.
described in the next section.

2. INSTALACIÓN DEL DRIVER USB

Inserte el Datalogger en algún Puerto USB disponible de su computadora. Si es la primera vez que conecta el Datalodder, le aparecerá la siguiente pantalla en su PC:

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install software for:
Silabs C8051F320 USB Board
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

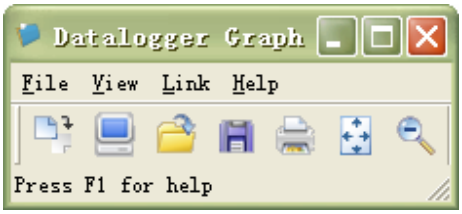
Seleccione la primera opción de ‘recommended’ (asegúrese de que el CD de instalación está todavía en la unidad de CD-ROM) y siga las instrucciones que le irán apareciendo en las siguientes pantallas del proceso de instalación. Este proceso solo tendrá lugar la primera vez que se instale el driver. Una vez instalado, esta pantalla no volverá a aparecer.

3. FUNCIONAMIENTO DEL SOFTWARE DEL DATALOGGER

Con el Datalogger conectado al PC, haga doble click en el icono del software del Datalogger para iniciar el programa. La pantalla principal del programa mostrará las opciones que se indican más abajo.

Aviso: Cuando se inserta el Datalogger en el pureto USB, la batería del mismo se descarga a un ritmo superior al habitual. No tenga el aparato conectado al puerto USB duranto períodos prologados de tiempo con el fin de conservar durante más tiempo y mejor la batería del Datalogger.

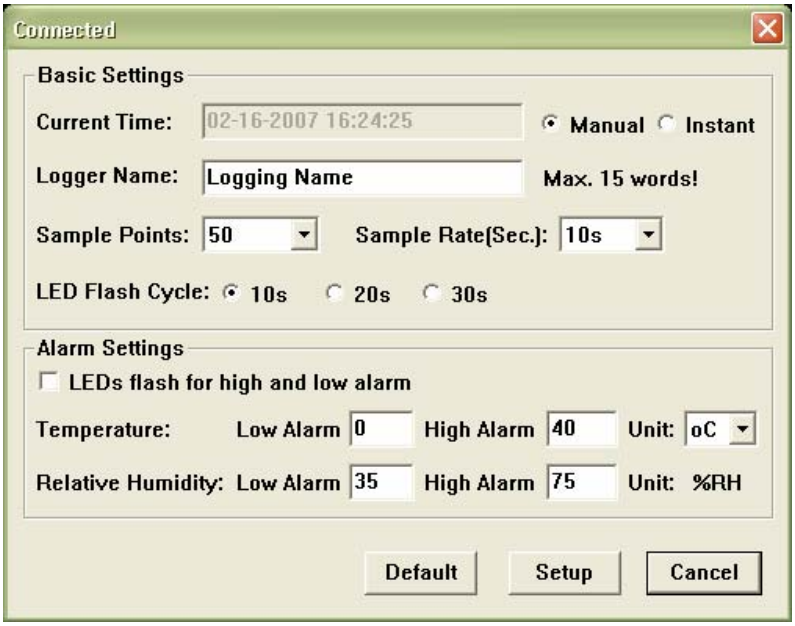
4. BARRA MENÚ



De izquierda a derecha, los iconos o símbolos de la barra menú representan las siguientes funciones: DATA DOWNLOAD (DESCARGA DE DATOS), LOGGER SETUP (CONFIGURACIÓN), FILE OPEN (ABRIR ARCHIVO), FILE SAVE-AS (GUARDAR ARCHIVO), FILE PRINT (IMPRIMIR), VIEW ALL (VER TODOS), y ZOOM. Además, en la parte superior aparecen las opciones desplegables de FILE, VIEW, LINK, y HELP, también explicadas en los próximos parágrafos.

① LOGGER SETUP (CONFIGURACIÓN)

Pulse sobre el segundo icono desde la izquierda o bien seleccione la opción LOGGER SET del menú desplegable que encontrarán en la opción de LINK. La pantalla de configuración se le aparecerá. Debajo de la ilustración le explicamos cada apartado:



- El campo de CURRENT TIME se sincroniza automáticamente con la fecha y hora de su PC.
- El MANUAL e INSTANT botones de selección le permiten iniciar las mediciones de temperature de forma instantánea (INSTANT) al salir del programa o bien manual (MANUAL) más tarde.
- El LOGGER NAME permite dar nombre a cada Datalogger para identificarlo en caso de que tuviera varios.
- El campo de SAMPLE POINTS permite confirgurar el número de mediciones que desea que realice el aparato.
- El SAMPLE RATE permite configurar la frecuencia de las mediciones.
- El LED Flash Cycle permite configurar la frecuencia de parpadeo de la luz indicadora LED. Cuanto más especiado en el tiempo más ahorro de batería.
- Los ALARM SETTINGS del menu de SETUP le permite confugurar los límites de alerta por enciama HIGH o debajo LOW en function de unos valores predeterminados de temperature y humedad que usted desee. Cuando éstos se sobrepasen, el aparato le avisará encendiendo la luz LED su usted lo desea. Para ello debe activarlo desde la opción de “LED’s flash for high an low alarm”.

Para guardar la configuración personalizada, pulse sobre el botón de SETUP. Pulse en el botón de DEFAULT para reestablecer los parámetros que por defecto vienen de fábrica. Pulse CANCEL para cancelar la configuración.

Aviso: Toda la información almacenada en el Datalogger se eliminará una vez se haya terminado un nuevo proceso de configuración. Guarde los datos antes de realizar una nueva configuración del aparato.

Asimismo, asegúrese antes de iniciar un nuevo proceso de medición que la batería se encuentra en buen estado para que dure hasta el final del período de medición indicado por usted.

Si se seleccionó la opción INSTANT en el menu de configuración SETUP, el Datalogger inidicará el proceso de medición una vez se haya pulsado el botón de SETUP. Si se seleccionó la opción de MANUAL, el Datalogger empezará las mediciones una vez se haya pulsado manualmente el botón amarillo del aparato durante aprox. 3 segundos o hasta que las dos luces del aparato se enciendan a la vez.

El almacenamiento de las mediciones continuarán con la frecuencia indicada por usted hasta alcanzar el numéro de mediciones (sample points) que especificó en la pantalla de configuración.

La luz LED verde parpadea cada vez que se realize una medición y las luces amarilla o roja se encienden en señal de alarma cuando se ha excedido (por encima o por debajo) la temperatura del rango por usted preestablecido. Para más información, vea el apartado de Simbología de la luz LED.

② DATA DOWNLOAD (DESCARGA DE DATOS)

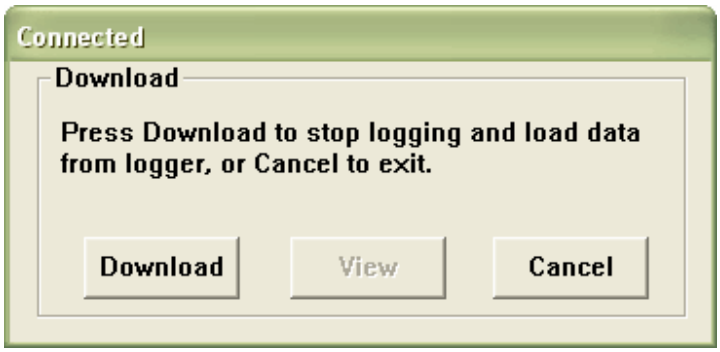
Siga los siguientes pasos para pasar los datos almacenados desde su Datalogger a su PC:

A. Conecte el Datalogger al mismo puerto USB que utilize cuando lo instaló por primera vez.

B. Abra el programa del Datalogger si todavía no está abierto.

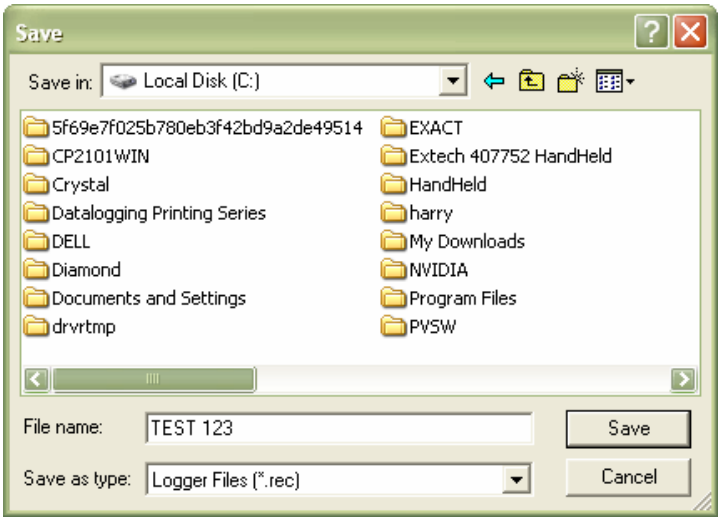
C. Pulse sobre el primer icono empezando desde la izquiera o seleccione la opción Data Download desde el desplegable LINK.

D. Le aparecerá la siguiente ventana. Pulse el botón DOWNLOAD para iniciar el proceso de descarga.

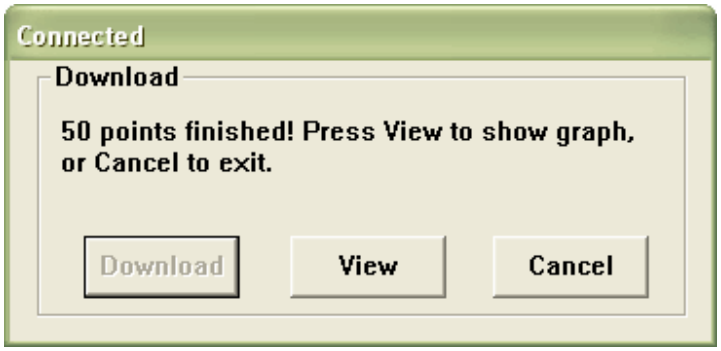


Si los datos de las mediciones han sido descargados correctamente, las ventanas de VIEW y la de SAVE (ambas se muestran más abajo) aparecerán.

En la ventana de SAVE, indique el nombre del archivo y donde desea guardar los datos en su PC. Más adelante podrá utilizar la opción de SAVE-AS y guardar también los datos en diferentes formatos como Excel, Texto, etc.. si no se dice nada, los datos serán guardados bajo la extensión de archivo .rec utilizada sólo por este programa.

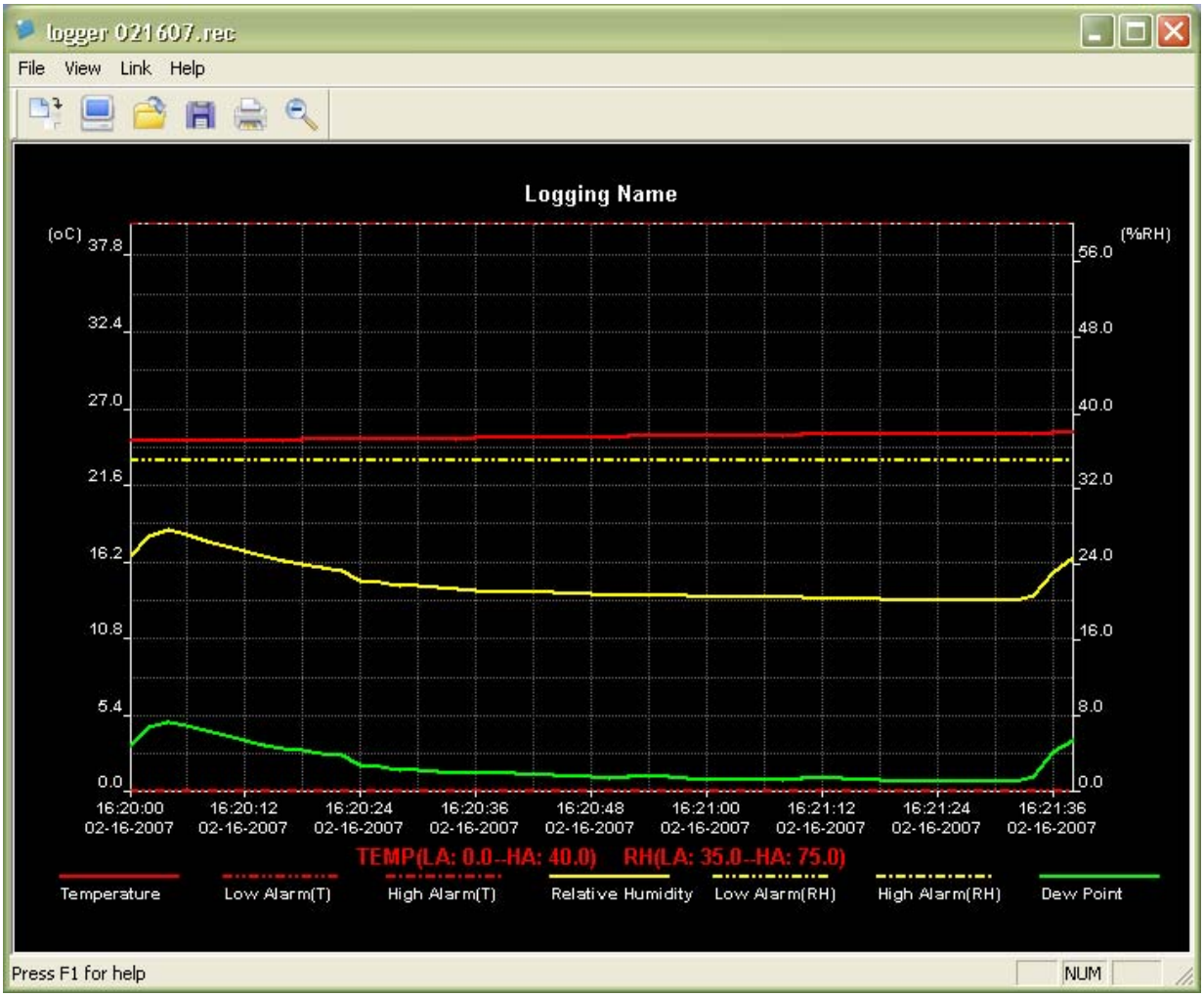


En la ventana de VIEW (debajo) pulse el botón de VIEW para visualizar los datos gráficamente. Si no hay datos almacenados, el programa se lo indicará apareciéndole una ventana de alerta.



Cuando se pulsa el botón de VIEW, aparece la ventana gráfica de datos.

El gráfico de datos se muestra en dos ejes x-y con la Fecha/Hora representada en el eje horizontal y la Temperatura/Límites de Alarma representados en el eje de la y:



Para acercar/alejar datos y visualizalos con más detalle existen varias opciones:

1) Con el mouse haga click o arrastre la zona alrededor de un area de datos y así la ampliará.
2) También puede ampliar la zona de datos con la icono correspondiente que tiene en la barra menú.
3) Seleccione VIEW ALL o ZOOM OUT del desplegable VIEW.

En el ejmplo de gráfico que se muestra arriba, la temperature es representada por la línea roja continua. Las trazas de linea roja discontinua reflejan zonas de temperatura donde se han superado los límites de alarma.

Para personalizar la ventana del gráfico, puede seleccionar las opciones de SHOW TRACES, BACKGROUND, GRID LINES, y MASK POINTS desde el desplegable VIEW. Éstas opciones le permitirán:

SHOW TRACES: Permite al usuario ver los datos con lineas trazadas (Temperatura & Alarmas).

BACKGROUND: Permite cambiar el color del entorno.

GRID LINES: Permite incluir o quitar líneas de los ejes x e y.

MASK POINTS: Permite resaltar los puntos de mediciones de la línea continua.

③ FILE OPEN, FILE SAVE-AS (ABRIR ARCHIVO, GUARDAR COMO..)

Para pasar de los datos almacanados en el formato de este programa (.rec) a otros formatos,pulse sobre el icono de SAVE AS (el cuarto desde la derecha o bien seleccione la opción SAVE AS desde el desplegable FILE. El archivo puede ser guardado en los siguientes formatos:

TEXT FILE (.txt) - Texto

EXCEL FILE (.xls) - Excel

BITMAP FILE (.bmp) – Bitmap (archivo de imágen)

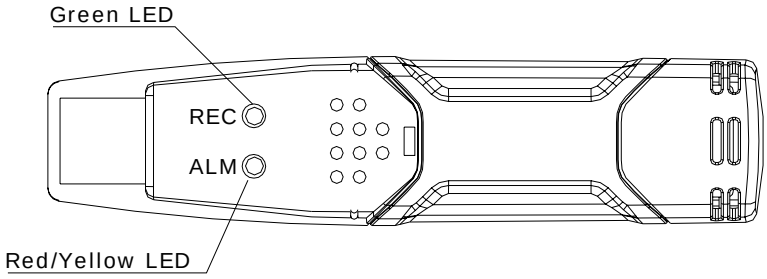
Para abrir un archivo guardado y verlo en el gráfico de datos, haga clic sobre el icono de FILE OPEN (tercero desde la izquierda) o bien seleccione la opción FILE OPEN desde el desplegable FILE. Seleccione el archivo .rec que desee abrir.

④ FILE PRINT (IMPRIMIR DATOS)

Para imprimir los datos, pulse sobre el icono PRINT desde el desplegable FILE. El gráfico puede ser imprimido en color utilizando impresora de color.

Aviso : El Datalogger mantiene almacenados los datos en su interior hasta que se inicia una nueva sesión de mediciones. Cuando se inicia una nueva session de mediciones, el Datalogger borra los datos almacenados hasta el momento en el aparato. Asegúrese de haber guardado los datos antes de iniciar una nueva session de mediciones.

5. LED STATUS GUIDE (SIMBOLOGÍA DE LA LUZ LED)



LED Status	Indicador	Acción
REC ALM	**Ambas luces LED apagadas** ***Datalogger no activo*** **o** ***Pilas descargadas***	**Puede empezar las mediciones** **Reemplace las pilas**
REC ALM	**Luz verde parpadea cada 10 seg. *** ***Datalogger activo y tomando lecturas, ninguna alarma activa***** **Parpadeo luz verde cada 10 seg.** ***Inicio mediciones retrasado***	**Para empezar las mediciones manualmente, pulse el botón hasta que las luces verde y amarilla parpadeen.**
REC ALM	**Luz roja parpadea una sola vez cada 10 seg. *** ***Midiendo, alarma de baja humedad ****** **Luz roja parpadea dos veces cada 10 seg. *** ***Midiendo, alarma de alta humedad ****** **Luz roja parpadea cada 60 seg.** ***Pilas descargadas********	**Si se han descargado las pilas, se pararan las mediciones. Reemplace las pilas. No se perderán los datos almacenados.**
REC ALM	**Luz amarilla parpadea una sola vez cada 10 seg. *** ***Midiendo, alarma para baja TEMP****** **Luz amarilla parpadea dos veces cada 10 seg. *** ***Midiendo, alarma de alta TEMP****** **Luz amarilla parpadea cada 60 seg.** ***Datalogger lleno. No caben más datos.***	**Descargue datos.**

* Para alargar la vida de las pilas, las frecuencias inficadoras de las luces LED pueden ser modificadas desde el software.

** Para ahorrar energía, la luz de alarma de temperature y humedad se puede descativar desde el software.

***Cuando las alarmas de temperature y humedad se activan, las luces LED alternan su ciclo.

****Cuando las pilas están descargadas, todas las mediciones se paran, pero los datos hasta el momento almacenados no se pierden.

GUEMISA
Sta. Virgilia, 29 - 28033 Madrid - Tfno.: 91 764 21 00
Desde 1986 suministrando sensores e instrumentación
http://www.guemisa.com - ventas@guemisa.com

MAS-1

4-20 mA Soil Moisture Sensor

User Manual

Version 4

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1. Introduction

Thank you for choosing the MAS-1 4-20 mA Soil Moisture Sensor. These innovative sensors will enable you to monitor soil moisture accurately and affordably with a standard 2-wire, 4-20 mA analog interface for use with many data acquisition and control systems. The MAS-1 cannot be used with the standard Decagon data loggers.

Customer Support

If you ever need assistance with your MAS-1, or if you just have questions or feedback, there are several ways to contact us. Customer service representatives are available to speak with you Monday thru Friday, between 7am and 5pm Pacific time.

NOTE*: If you purchased your MAS-1 through a distributor, please contact them for assistance.*

E-mail:
support@decagon.com or **sales@decagon.com**

Phone:
1-509-332-5600

Fax:
1-509-332-5158

If contacting us by email or fax, please include as part of your message your instrument's serial number, your name, address, phone, fax number and a description of your problem.

Specifications

Electrical

Interface: Standard 4-20 mA, 2-wire analog transmitter
Supply voltage: 12-32 VDC continuous
Output current: 4-20 mA
Overvoltage protection: Yes
Reverse polarity protection: Yes
Settling time: 4 seconds
Wiring: Red wire: (+) supply
Black wire: (-) output
Shield: Not connected

Measurement

Type: Volumetric water content (VWC)
Range: 0-100% VWC typical
Resolution: Depends on current measurement (data acquisition) device
Accuracy: ± 6 % VWC with generic calibration for supported growing media up to 65% VWC, above which accuracy lessens. Increased accuracy can be achieved with a medium specific calibration. For more information on how to perform your own media specific calibration, or to have Decagon's calibration service perform one for you, visit us online at http://www.decagon.com.
Output: 4-20 mA current proportional to VWC
Sensor measurement interval: 1 second

Operating Environment

Temperature: -40 to 50 °C

Physical Properties

Dimensions: 8.9 cm x 1.8 cm x 0.7 cm
Cable: 2 m or 5 m (standard), 3 wire (22 AWG tinned Red and Black wires, 24 AWG tinned bare wire);
(Custom cable length available upon request)

Warranty

The MAS-1 has a one year warranty on parts and labor. It is activated upon the arrival of the instrument at your location.

Seller's Liability

Seller warrants new equipment of its own manufacture against defective workmanship and materials for a period of one year from date of receipt of equipment (the results of ordinary wear and tear, neglect, misuse, accident and excessive deterioration due to corrosion from any cause are not to be considered a defect); but Seller's liability for defective parts shall in no event exceed the furnishing of replacement parts F.O.B. the factory where originally manufactured. Material and equipment covered hereby which is not manufactured by Seller shall be covered only by the warranty of its manufacturer. Seller shall not be liable to Buyer for loss, damage or injuries to persons (including death), or to property or things of whatsoever kind (including, but not without limitation, loss of anticipated profits), occasioned by or arising out of the installation, operation, use, misuse, nonuse, repair, or replacement of said material and equipment, or out of the use of any method or process for which the same may be employed. The use of this equipment constitutes Buyer's acceptance of the terms set forth in this warranty. There are no understandings, representations, or warranties of any kind, express, implied, statutory or otherwise (including, but without limitation, the implied warranties of merchantability and fitness for a particular purpose), not expressly set forth herein.

2. About the MAS-1

The MAS-1 measures the dielectric constant of the soil in order to find its volumetric water content. Since the dielectric constant of water is much higher than that of air or soil minerals, the dielectric constant of the soil is a sensitive measure of water content. The MAS-1 supplies a 70 MHz oscillating wave to the sensor prongs that induces an electromagnetic field in the medium (soil) surrounding the sensor. The charging and discharging of the sensor is controlled by the dielectric of the surrounding soil.

A microprocessor on the MAS-1 measures the charging of the sensor, and therefore the dielectric constant of the soil which is related to the water content of the soil. The microprocessor makes a dielectric measurement and updates the transmitted current once per second. The transmitted 4-20 mA current can be converted to the water content of the soil using a simple calibration function.

The MAS-1 was designed to be used with standard 4-20 mA controllers and monitoring systems. It cannot be used with Decagon logging systems. For more information about using Decagon logging systems please contact Decagon's customer support representatives.

3. Integrating the MAS-1

A 4-20mA system generally consists of a sensor, a transmitter, a power supply, and a device to read the current being transmitted through the current loop. The MAS-1 is an integrated sensor and 4-20mA transmitter. When the MAS-1 is powered by the Power Supply, it transmits a current though the loop that is proportional to the soil dielectric permittivity and therefore the soil volumetric water content. In Figure 1, the current loop is shown by the dotted line labeled I=4-20mA. The arrows indicate the direction of the current.

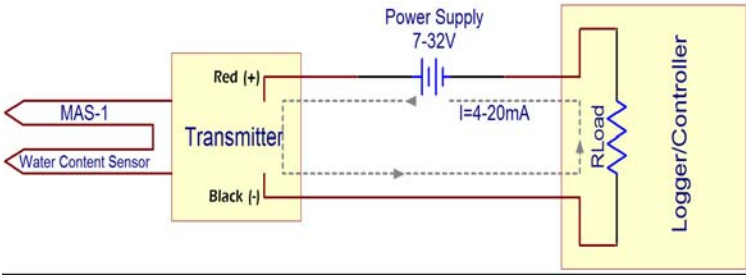


Figure 1 - 4-20mA current loop diagram

The MAS-1 uses a microcontroller to regulate the interval at which it takes measurements. It takes one second from the time it is powered up to take its first measurement and transmit current though the loop. The trasnmitted current will reach a stable value within four seconds of power up. After the initial four second startup, measurements are taken every one second, while the current in the loop is continuously maintained. Since the measurement intervals are controlled

by the MAS-1 itself, there is no need to pulse the excitation voltage. A constant supply voltage should be applied in order for the MAS-1 to function as it is designed.

Wiring

Conventional (PLC)

A Programmable Logic Controller (PLC) is typically used to read the current transmitted through the MAS-1. The red wire (see Figure 2) of the MAS-1 is connected to a voltage output terminal that is able to supply 12-32 VDC. The black wire is connected to an input terminal that is capable of accepting a current input ranging from 4 mA to 20 mA. For the MAS-1 to function properly, the voltage drop from the red to the black lead must be 12 V or greater.

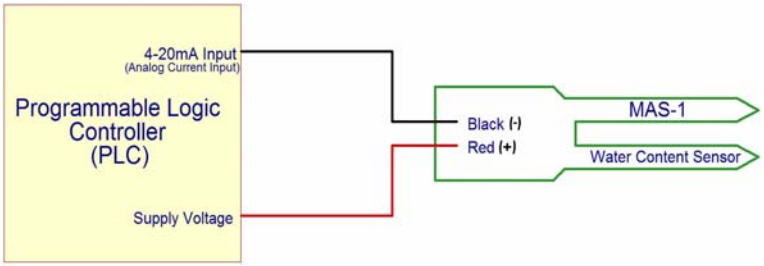


Figure 2 - Typical wiring connection

Non-Conventional

When using a device, such as a data logger, that does not have an input capable of measuring current, a pickoff resistor can be used as shown in Figure 3. Assuming that the Single Ended Input has an input impedance, or resistance, much

larger that of R_{Volt}, then all of the current in the 4-20 mA loop passes through R_{Volt}. If the data logger can measure the voltage drop over the R_{Volt}, then the current can be calculated as

$$I = V_{measured} / R_{Volt} \quad (1)$$

where I (mA) is the 4-20 mA current, R_{Volt} (ohms) is the resistance of the pickoff resistor, and $V_{measured}$ (mV) is the voltage drop over R_{Volt}.

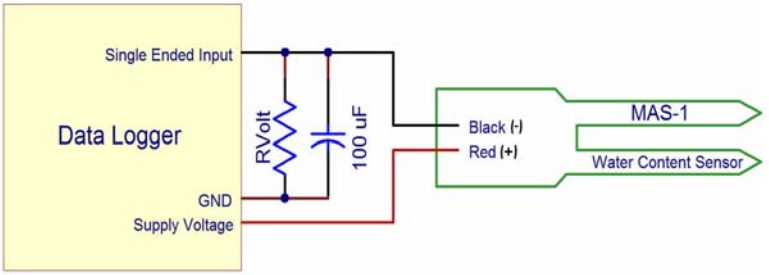


Figure 3 - Wiring connection for devices without current inputs

The optional 100uF capacitor shown in parallel with the R_{Volt} reduces measurement noise. It should have a voltage rating higher than the largest supply voltage. Be sure to observe correct polarity.

The MAS-1 requires a voltage of at least 12 V. This limits the value of R_{Volt} since part of the total voltage drop will be across the resistor. Equation (2) can be used to determine the maximum value for R_{Volt}. Table 1 shows some resistance values.

$$V_{Supply} - 12 = 0.02\ R_{Volt\ Max} \quad (2)$$

Supply Voltage	Load
13 V	50 ohms
24 V	600 ohms
32 V	1000 ohms

Table 1 – Maximum resistance values for R_{Volt} at specified voltages

The MAS-1 sensor has several advantages over voltage-output sensors, even for voltage-input data loggers.

- The MAS-1 supply voltage doesn't need to be regulated for the sensor to work properly; it can be any value between 12 and 32 volts, without affecting sensor output.
- When using a current-based sensor like the MAS-1, the signal is not affected by electrical resistance in the cable, so the sensor output is not affected by cable length or wire gauge.
- The MAS-1 requires only two conductors, so long lines are both lower in noise and less expensive.
- With the MAS-1sensor the source impedance is small, and a current loop is highly immune to noise on the line.
- Measured voltage can be tailored to a particular data acquisition system simply by adjusting the value of $R_{Volt.}$ A typical application might be to use a MAS-1 with a 12 volt supply and a R_{Volt} value of 1 ohm. The output voltage range is the product of the current and the resistance (Equation (1)), so for 4-20 mA it would be 4 to 20 mV.

Testing the Sensor

After integrating the MAS-1 into your PLC or other data acquisition system, it is always a good idea to test the sensor output to verify that it is functioning correctly with your system. Two convenient test conditions are having the sensor surrounded by air and water. To test in air, suspend the sensor from the cable, making sure that it is at least 6 inches from any object. To test in water, place the sensor in a bucket of tap water (do not use de-ionized or distilled water). The entire sensor (prongs + black plastic electronics portion) should be immersed in water, and should be at least 2 inches from any container surface. Under these conditions, the sensor should transmit in the following ranges (approximate):

Air: 3.4 to 4.7 mA
Tap water: 18.1 to 22.4 mA

Note that the sensor output can go above 20 mA and below 4 mA.

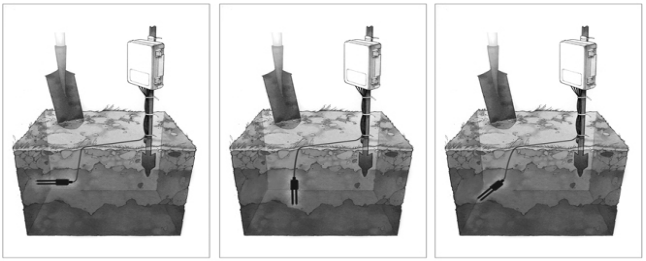
4. Installing the MAS-1

When selecting a site for installation, it is important to understand that the soil adjacent to the sensor surface has the strongest influence on the sensor reading and that the sensor measures the volumetric water content. Therefore any air gaps or excessive soil compaction around the sensor can profoundly influence the readings. Also, do not install the sensors adjacent to large metal objects such as metal poles or stakes. This can attenuate the sensor's electromagnetic field and adversely affect sensor readings. Because the MAS-1 has gaps between its prongs, it is also important to consider the size of the media you are inserting the sensor into. It is possible to get sticks, bark, roots or other material stuck between the sensor prongs, which will adversely affect readings. Finally, be careful when inserting the sensors into dense soil, as the prongs will break if excessive sideways force is used when pushing them in.

Procedure

1. The MAS-1 sensor was designed for easy installation into the soil. After digging a hole to the desired depth, push the prongs on the sensor into undisturbed soil at the bottom of the hole or into the sidewall of the hole. Make sure that the prongs are buried completely up to the black overmolding. The sensor may be difficult to insert into extremely compact or dry soil. If you have difficulty inserting the sensor, try loosening the soil somewhat or wetting the soil. **Never pound it in!**

2. Carefully backfill the hole to match the bulk density of the surrounding soil. Be careful to not over stress the cable or overmold by bending when installing the sensor.



Orientation

The sensor can be oriented in any direction. However, orienting the flat side perpendicular to the surface of the soil will minimize effects on downward water movement.

Removing the Sensor

When removing the sensor from the soil, do not pull it out of the soil by the cable! Doing so may break internal connections and make the sensor unusable.

5. Calibration

The current transmitted by the MAS-1 is proportional to the dielectric permittivity of the medium surrounding the sensor, and therefore its volumetric water content (VWC) of the medium. The VWC is calculated by applying a calibration equation to the current transmitted by the MAS-1. The following are generic calibration equations for common growth media. Applying these equations will generally result in accuracy of ± 6% VWC as long as the electrical conductivity of the medium is less than 8 dS/m. If you wish to use the MAS-1 in a medium that isn't listed below, if you need better than ± 6% accuracy, or if you are working in a high salinity material, then you should develop a custom calibration for your particular medium. See www.decagon.com for step-by-step instructions on developing a custom calibration. Decagon can also develop a custom calibration for your medium; contact Decagon for more details on the calibration service.

Mineral Soils

A single calibration equation will generally result in good accuracy for all mineral soil types with electrical conductivity < 8 dS/m. VWC is given by:

$$VWC = 0.00328 * mA^2 - 0.0244 * mA - 0.00565$$

If your data acquisition system isn't capable of higher order mathematical operations, the mineral soil calibration can be

approximated by the following linear model. This will result in slightly worse accuracy at low VWC, with errors becoming large above 35% VWC.

$VWC = 0.0479 * mA - 0.391$

Potting Soil/Peat

The following equation can be used to convert MAS-1 transmitted current into VWC in potting soil and peat potting mixes. Please note that different potting soil types are quite variable, so this calibration equation may not result in good accuracy in your particular mix (although precision should still be good). We recommend a custom calibration for best accuracy when using the MAS-1 in potting soils.

$VWC = 0.00531 * e^{(0.29*mA)}$

Rock Wool

The MAS-1 was calibrated in Groden Expert™ rockwool at several electrical conductivities. VWC can be calculated as:

$VWC = 0.00446 * mA^2 - 0.0359 * mA + 0.0741$

6. Troubleshooting

If you encounter problems with the MAS-1, they will usually be caused by one of two situations

- If the MAS-1 readings in air and/or water are outside the ranges given in the Testing the Sensor section, then there is likely a problem with the connection to the PLC or other data acquisition system. Check the wiring and check to make sure that the supply voltage is in the specified range.

- If the MAS-1 is reading a negative value for VWC while it is inserted into the soil, make sure that you have good sensor-to-soil contact. When inserted, the MAS-1 should be completely covered up past the black overmolding. Removing and re-installing the full length of the sensor with good sensor-to-soil contact should remedy this problem.

If problems persist, contact Decagon for assistance.

Medidores ambientales » Termo higrometro » HIBOK 302 TERMOHIGRÓMETRO H. Rel., Pto. rocio, Temp., Búlbo húmedo

Termo higrómetro digital portátil, con doble display de gran precisión. Puede medir humedad relativa, humedad absoluta, punto de rocío y bulbo húmedo, además de otras funciones. De gran utilidad por su tamaño, prestaciones y fiabilidad. De fácil manejo. Recomendable para uso general, aire acondicionado, cámaras de frío, alimentación y conservas, etc.

Características:

	H302
Termo higrómetro digital de 3 ½ dig. (1999)	•
Doble display para medidas simultaneas	•
Medidas de humedad relativa y absoluta	•
Medida de temperatura ambiente	•
Medida del punto de rocío y bulbo húmedo	•
Modo max, min, retención de lectura (Hold)	•
Medida en º C y º F	•
Luz en pantalla y auto apagado	•
Aparición de símbolos en pantalla	•
Manejable, ergonómico y fácil de usar	•
Selección de rango: auto rango	•

Especificaciones:

Medidas de HUMEDAD	
Rango	0.0% a 100% H.R.
Resolución / Precisión	0.1 % y 1% / ±(3%) + 2 dig.
Medidas de TEMPERATURA	
Rango	-20º C a 60º C
Resolución / Precisión	0.1º C y º C / ±(0.5º C)
Otras especificaciones	
Sensor de humedad	Capacitivo de alta precisión
Rango temperatura para bulbo húmedo	0º C a 80º C
Rango temperatura para punto de rocío	-30º C a 100º C
Tiempo de muestreo	15s.
Normas	CE
Alimentación	1 bat. de 9V (6F22)
Tamaño	220 x 63 x 28 mm
Peso	400g.

Fabricante:
HIBOK

Cód. 435

Accesorios Incluidos:

Batería
Estuche
Instrucciones
en castellano

GUEMISA (Electrónica Guerra y Miró Guemisa S.L.)
Sta. Virgilia, 29 - local - 28033 Madrid (Spain)
Tlfno.: (034) 91 764 21 00 Fax.: (034) 91 764 21 32
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